

Reference

206

Olive mill wastewater: a suitable medium for lipase production by yeasts

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Abstract

The olive oil consumed in the world is mainly produced in the Mediterranean countries, with Portugal as one of the ten major producers. Olive oil production results on a large amount of liquid waste, which represents a critical environmental problem. The quality and quantity of olive mill wastewater (OMW) constituents are dependent of many factors, such as olives type and maturity, climatic conditions and region of origin, cultivation methods, and technology used for oil extraction¹. The most important organic compounds of OMW include sugars, tannins, polyphenols, polyalcohols, pectins and lipids, with chemical oxygen demand (COD) up to 220 g.L⁻¹. Previous work has shown that OMW can be used as culture medium for different lipolytic yeast strains^{2,3}. The aim of this work is the optimization of lipase production and the wastewater degradation by two lipolytic yeast strains, *Yarrowia lipolytica* W29 and *Candida cylindracea* CBS 7869. OMW collected from different 3-phase continuous olive mills were used and characterized chemical and biochemically. OMW based medium composed by non diluted and centrifuged (3000 rpm, 10 min) OMW, was supplemented with ammonium chloride, yeast extract, and phosphate buffer (pH 7.2, 0.1 M). Batch cultures were conducted in a 2-L bioreactor (Biolab, B.BRAUN) at different values of pH, aeration and agitation rates. Both strains were able to grow on OMW based medium and to consume sugars and COD. Comparing the performance of both strains at pH 7.2 with agitation and aeration rates of 400 rpm and 1.5 L.min⁻¹, respectively, *Candida cylindracea* revealed to be the most efficient strain for lipase production. These results confirm that the yeast strains used have a great potential for OMW valorization by its use as culture medium for biomass and enzymes production. Further work is been conducted in order to optimize the overall lipase production process.

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